

Learning Through Teaching: Impact on Knowledge Retrieval Immediately After Student-Teaching in an EFL Setting

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ABSTRACT

Learning through teaching is often described as an enriching experience that reflects a deeper understanding of one's area of learning focus. To understand this potentially rewarding experience, this research, as the focal point, intends to identify any significance regarding knowledge retention between students who were tested on a certain subject matter immediately after they had taught it to several classmates, and those who were tested several weeks after teaching. On a secondary note, the test scores of the student-taught material themselves help to show how well the students learned from teaching in general. The study consists of two groups, each of which was composed of 24 Ecuadorian EFL college students who taught on a basic grammar point to several other peers in their class. The retrieval of the knowledge that the subject group had taught was examined a few minutes after their teaching. The control group's knowledge was examined several weeks (at least one month) after their time in front of the classroom. The results are surprisingly insignificant. Additionally, the average test grades scored by the participants which reflect the grammar points taught were rather low. The question, thus, remains on whether or not certain factors played a role that may have influenced the results. Therefore, further research on this topic is recommended, perhaps with some variations which could favor more the notion of learning by means of teaching.

Keywords: EFL, English, grammar, interteaching, learning, teaching

INTRODUCTION

It was the Roman philosopher, Seneca, who posed the idea that "While we teach, we learn." A teacher does not usually go through his/her entire career without learning not only new techniques and ways of getting the message across, but concepts and ideas that are linked to the actual subject matter itself.

Many teachers will believe this to be true, especially when they have been standing in front of the classroom for several years teaching the same content over and over again, while ever so refining their style in order to explain and demonstrate their knowledge efficiently to others-- this in itself is a learning process. However, the question remains on whether or not the teaching of a certain topic proves to be a supreme or even an effective way of learning with respect to a more traditional style of self-study. Although this current study was carried out with Ecuadorian students who were learning English as a foreign language between October 2018 and August 2019, the research itself is hardly new. Since the 1960s, quite a few studies on this matter have been conducted (Duran, 2016) and in

fact, there are even some educational centers that institute a learning-through-teaching philosophy, primarily in Germany (Aslan, 2015).

What is the idea behind learning through teaching? Students first need to understand the content in order to teach efficiently. This way, in both preparation and actual teaching, learning is fulfilled (Aslan, 2015). But the idea of teaching is not just a presentation of a certain topic. Student teachers should be engaged in the process in order to enhance motivation among others, make sure that their message is clear and getting through, and maybe even most importantly, accept the fact that they are now taking on the role of an educator, which means that the majority of the responsibility lies on their shoulders while they are permitted to be in front of the classroom. The teacher's role during the instruction time is merely meant to observe, assess, and step in in the case of an emergency (Aslan, 2015). Subjects from mathematics to foreign language, from science to business management (Aslan, 2015; Cortese, 2005; Goto and

Schneider, 2009; Koh et al., 2018) have been learned by means of teaching. And most students, even graduate students, have confessed that they were able to understand certain topics better after teaching them (Blair et al., 2007).

However, just like with many past research themes, it should be highlighted that this research could have focused on the comparison between the test scores of students who had taught the grammar points and the students who did not teach anything. That is not the case, however, at all. It was decided that the core of this research is to assess how well students are capable of both short and long-term retention of a certain topic that they teach to others. In other words, this research compares the assessment scores of two groups of students, which both actually did teach. First, the experiment tries to test the hypothesis in which the students of the subject group shall produce better scores than the control group. The subject group was evaluated on a certain grammar point just a few minutes after they had taught while the control group was tested on the same grammar material several weeks or even a few months after they had taught. Second, it is believed that both the subject and the control group will have decent or at least passing scores, thus allowing one to realize that learning through teaching might prove beneficial in any case. The subject matter on which this research is focused concerns six grammar points in English as a foreign language. This study was carried out during the fall semester of 2018 and the spring semester of 2019 at the National University of Education of Ecuador (UNAE).

LITERATURE REVIEW

Defining Teaching and Learning

To delve into the idea of learning through teaching, it is important to understand the concept of each term: teaching and learning. Learning itself is considered as an active, cognitive, constructive, and self-regulated process (Beltran, 2004). However, Brown (2006) defines learning as a way of acquiring and retaining information or skills. One must actively practice and focus on the concept to be attained. However, a learned notion is not always everlasting as it is subordinate to whether one can remember. On the other side of the spectrum, teaching involves the way of facilitating learning to the students (Meneses, 2007) and allowing for the right conditions for learning to take place (Brown, 2006). Although much depends on the student's willingness to learn, the learning objectives to be met also rely on the teaching style and strategies that the educator utilizes (Paez, 2006). In other words, it is possible that students may or may not learn based on one's methods of teaching.

What exactly the holy-grail method is for one to learn effectively has been a subject for debate for centuries. In fact, it is said that different strategies used in the classroom, not just one, are crucial to maintain a

positive learning atmosphere (Schunk and Zimmerman, 1998). In particular, the practice of teaching by means of learning has been thought of as an effective and efficient strategy of offering the opportunity for the pupil to increase his/her competence levels by means of clarifying ideas and concepts, thus allowing to attain and retain new knowledge (Akobe et al., 2019).

Concepts of student-teaching

For learning through teaching to effectively take place, certain factors must be in order. First of all, students taking on the role of the teacher must adequately learn the topic that is to be presented. This is an essential step since most of the learning takes place retrieving the information to be taught, the planning, and the preparation (Koh et al., 2018). Secondly, it is important for individuals taking on the role of the teacher to encourage others to learn by implementing various techniques and strategies while teaching the subject. In other words, students must try to work around the idea of just giving a simple presentation or lecture. Furthermore, teacher-students must realize that while they are acting as the teacher, the ultimate goal is that they are to learn as well.

Advantages of student-teaching

When the aforementioned methods are applied, learning through teaching is said to promote many qualities such as self-confidence, patience, and creativity; and competencies such as presentation, research, and communicative skills (Aslan, 2015). In addition to skill development, students simply tend to learn more efficiently when they study or research on a given topic expecting to then teach it than when students study just for themselves. For example, several studies have suggested that students who know they are expected to teach on a certain topic may be apt to engage themselves in more effective learning strategies than students who learn from more traditional methods (Nestojko et al., 2014). Also, during a student's lesson, the learner may ask for more information or some extra clarification, thus causing the student-teacher to reflect further upon the subject matter at hand. This, in turn, can help the student-teacher to acquire a richer, more in-depth knowledge of what he/she is teaching (Duran, 2016).

Disadvantages to student-teaching

On the other hand, there is also a downside to this. It must simply be taken into consideration that students are not professionals; often what is taught, may be just plain wrong and/or ill-suited for the students. In addition, the audience itself may be incapable of distinguishing right from wrong explanations, so if a student-teacher explains a subject matter while giving false information, this will be detrimental to both parties (Rodrigo et al., 2013).

Even if the instructor were to step in afterward to make certain corrections, it should be noted that it might be

difficult for the teacher-students to absorb the new, (right) information. This may be true, especially if during the class preparation time, substantial fossilization of wrong information has had time to set in.

Along these lines, the actual class preparation is sometimes seen as bothersome or overwhelming (Goto and Schneider, 2009). In addition to learning the material well enough in order to teach, students must put extra time and effort into creating activities that go along with the lesson plan, which can, thus, potentially take away from the actual learning time.

Finally, not all students can or like to learn the same way. For low achievers, especially, it is uncertain if learning through teaching is considered an effective method. Goto and Schneider (2009) simply suggest that further research in this specific area should be conducted.

METHODOLOGY

Approach

This study tries to compare EFL students' knowledge retention based on quantitative assessment immediately after, and several weeks or even a few months after teaching took place. The main steps taken to carry out this research were that every week, a group of two students had to plan and teach a particular grammar point that I had previously reviewed in class. Afterward, the student-teachers were then evaluated on their knowledge retrieval in the form of multiple-choice and fill-in-the-blank questions (10 questions in all) within either the midterm or final exam for the fall (first) semester or in the form of a quiz during the spring (second) semester. In regard to the grammar points, six topics were taught by the students in total. These were *present simple for "to be"*, *present simple in general*, *too/either*, *verb patterns*, *present simple vs present continuous*, and *the future tense with "going to"*.

Before choosing the student subjects, I would teach the grammar point, go through the activities and assignments associated with such points, and then randomly select a group of two students to prepare a lesson on it for not more than 15 minutes (in some rare cases, a few groups went over 15 minutes, and I was lenient enough to allow for this, but the 30-minute mark was never reached). Each group of students was permitted to teach the grammar point in the way that was felt best. After all, UNAE is a university tailored for students to graduate with an education degree. Consequently, contrary to the belief that student-teachers, in general, lack sufficient experience when it comes to teaching, it was hoped that the students who participated in this research would have had enough basic knowledge to teach at a decent level.

All of the students were relative to a pre-intermediate or A2 level, according to the Common European Framework of Reference for Languages (CEFR) (Council of Europe, 2018). Throughout the first and second semesters, a total of 24 groups of two students (48 students altogether) participated in this research.

These learners were randomly selected for this study from the class roster. During their time on the floor, students could teach the grammar in either English or Spanish or a mixture of both languages. And in most cases, students did a simple PowerPoint presentation which helped explain the grammar and gave examples. Additionally, the teacher-students allowed the class to practice with various games, activities, and/or exercises.

Assessment

For the first semester, the knowledge of the students reflecting the six grammar points they taught was tested no sooner than a month later in either the midterm or the final exam. The grammar points previously mentioned were not the only aspects being evaluated for the midterm or final grade but were selected and graded separately for this study. Additionally, the evaluation of these grammar points consisted of 10 multiple-choice and fill-in-the-blank questions altogether. The average scores of the 24 students (four students for each grammar point) were then tallied in percentage form. They were subsequently compared to what is most typical to the American grading system, in which 90%-100% would be considered as excellent, 80%-89% as good, 70%-79% as fair, 60%-69% as poor, and below 60% as fail (US Department of Education, 2008).

In the second semester, the same grammar points were used. Obviously, different students taught on these topics, but it was still the same number of students as from the previous semester. However, instead of waiting until either the midterm or final exam to tally the results, students were given a quiz on the grammar points on the same day they taught. Again, the quizzes were a mixture of fill-in-the blank and multiple-choice questions. Additionally, the questions were not the same as what was seen in the midterm and final exams from the previous semester; I wanted to avoid all possibilities of cheating on behalf of the participants. Testing the student-teachers immediately after their role as the teacher was meant to determine whether or not they were able to retain what they learned through teaching in a more condensed amount of time compared to the long-term duration in which students waited to be tested during the first semester. For the students who were evaluated immediately afterward, again, the same grading system was used with the students from the previous semester.

RESULTS

Figure 1 shows the average results for students who took tests reflecting the grammar points in each semester.

A two-sample t-test was performed in order to find out if there was significant difference between the average grade scores between the first-semester students ($M = 68.3$, $SD = 283.77$) and the second-semester students ($M = 68.67$, $SD = 200.27$). With a one-tailed hypothesis,

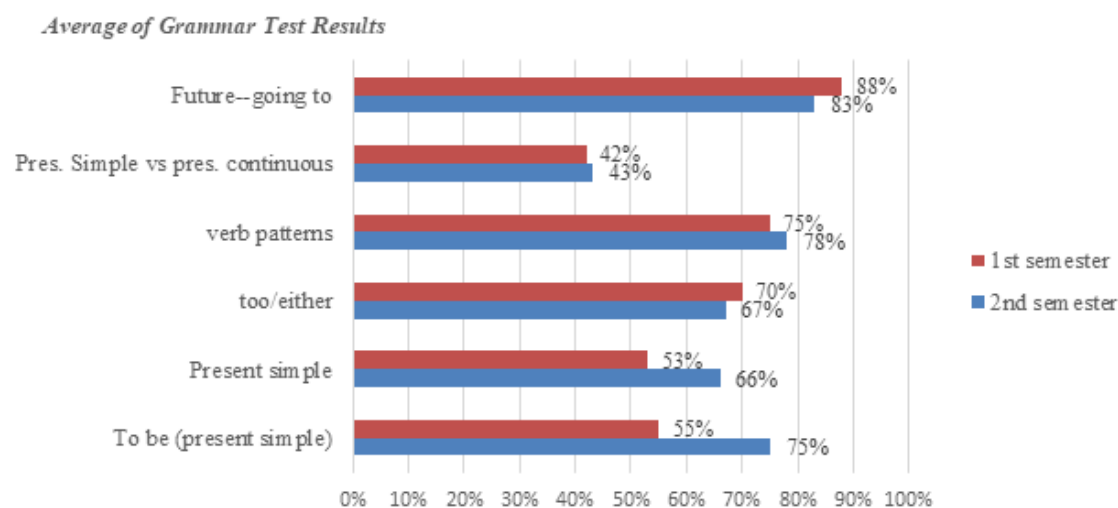


Figure 1: Average results for students who took tests.

the t-statistic proved not to be significant $t(5) = -0.54$, $p = .30113$ even at $p < .10$. In fact, another one-tailed t-test was performed with the grammar point that had the largest range of difference (20), which was *present simple (to be)*. For the first-semester students ($M = 55$, $SD = 1966.67$), the respective grades awarded were 80%, 100%, 0%, and 40%. For the second-semester students ($M = 75$, $SD = 366.67$), they were 60%, 60%, 100%, and 80%. Again, even at $p < .10$, the grades were not significant at $t(3) = -0.83$, $p = .219657$.

This of course is relatively simple to see even by means of a rough estimation as shown in Figure 1. This is mainly due to the fact that there is hardly any difference between the first and second semester students' results in grammar points dealing with *going to*, *present simple vs. present continuous*, *verb patterns*, and *too/either*. It could be noted that the second-semester students did way better than first-year students regarding *present simple with "to be"* and *present simple in general*. But even so, according to the data, there is no real significance. In addition, in two grammar points (*going to* and *too/either*) the first semester students, those who waited several weeks to be tested actually did slightly better than the second-semester students, those who were tested immediately after teaching.

Finally, it is also interesting to point out that on quite a few of the grammar points, on average, both the first and second-semester students did rather badly. Only in the future tense regarding *going to* did both semester students do well. However, according to the American grading system, in absolutely no case did the groups on average receive an excellent score (US Department of Education, 2008).

DISCUSSION

Significance of the Findings

It is true that four students made up each group per grammar activity, per semester. However, the fact that there were six grammar points meant that 24 students

accounted for what would be considered as the subject group and 24 as the control group—a total of 48 participants. With these numbers, it is easy to understand that perhaps even a larger group of students would have received relatively the same results.

From this, one must beg a few related questions and the first question involves the purpose of this research as a whole: Does it really matter if, in general, one's knowledge is tested on a subject that he/she has taught immediately afterward? Secondly, and one that has been debated for centuries, does learning through teaching seem to have much effect on students' performances? Strictly seen from this particular research, as seen from the above data, there is no significance, and in most cases, hardly any difference between students who were tested on grammar points immediately after they taught or several weeks afterward. To answer the second question, in the majority of the results, along with the average scores being quite similar, none of the groups did extremely well.

POTENTIAL REASONS FOR INSIGNIFICANCE

Lack of Learner Participation

It is important to look at certain factors that could have influenced this outcome. First of all, all of the participants were given the liberty to teach how they felt best. In general, though, during the actual teaching process, most student-teachers simply explained the grammar points while going through PowerPoint slides. While, of course, they were allowed to do so, virtually no learners, those receiving the information, bothered to ask questions or interrogate the knowledge of the student-teachers. When activities were done or games were played that dealt with the grammar topics in particular, in some of those cases, the student-teachers explained the instructions of the activities more than once, they guided certain students who did not quite understand the activities, and/or they

set some examples themselves so that the learners could see how the activities were to be done. However, as mentioned before, during the actual teaching of grammar, nobody questioned the student-teacher's authority. It is unclear whether or not the students were shy or if they had already known the material previously. Whatever the case, the lack of student input during the teaching time could definitely be an enormous reason as to why the test scores were generally low and the difference between the two groups showed no significance. Without any two-way interaction, it is highly unlikely that much learning took place on the part of the student-teacher. In this case, the student-teachers did not have to act or react quickly to off-the-wall questions posed by the students and thus, no critical thinking was taking place (Roscoe and Chi, 2007; Cortese, 2005).

Teaching Strategies

In addition, it is not easy to know if there had been much prior knowledge processing due to the fact that during the teaching, there was primarily a lot of knowledge-telling, or basic regurgitation of what students had learned before having their time in front of the classroom, (Duran, 2016). It is unclear whether or not the student-teachers had previously taken advantage of reflecting on what they knew and did not know, analyzed possible inconsistencies in their teaching styles, and reorganized their thoughts and explanations for deeper understanding and clarification. Additionally, it would have been important to generate a series of cognitive strategies, such as the organization and re-organization of their lesson plans, possible elaboration on certain explanatory points during the teaching, and even repetition or mock lessons before the actual instruction was to take place. On top of this, it is also inconclusive if the subjects made proper use of their own self-monitoring during the preparation. Asking themselves if they fully understood the topic well enough to teach it or identifying the parts of grammar topics that were not 100% clear, which would have been during the metacognitive phase of learning (Torrano and Gonzalez, 2004), would have played a crucial role in the students' knowledge retrieval during the evaluation.

This leads to the next point of discussion in the sense that if the student-teacher does not have much prior knowledge of what he/she is teaching, learning does not take place appropriately (Rodrigo et al., 2013). Indeed, these students were neither experts in the English language nor in their field of study (education). Nevertheless, during the actual teaching time, although I had almost expected some major errors by at least one or two groups, in fact, other than some spelling mistakes from the PowerPoint presentations or mispronunciation of certain vocabulary (i.e. mispronunciation of verbs ending in "es"), there were no serious issues regarding teaching the grammar "wrong" per say. Additionally, apart from certain questions regarding the style or technicalities of the classroom-teaching, such as "What happens if we go over time?"

or "Can we bring in treats and candies for the activities we have planned?", I never received questions dealing with the usage of the grammar points taught. I could, therefore, only assume, at least at the time, that the to-be student-teachers had a full understanding of the lesson they were going to be giving.

Insufficient Interest

Finally, one may be able to infer another, rather unique possibility for the given data: the students at UNAE just may not have been interested in learning English. UNAE is an Ecuadorian public university. By law (British Council, 2015), students graduating grade school from the public sector are required to obtain at least a B1, or an intermediate, level of English (Council of Europe, 2019). However, if the students in the class in which this research was carried out had no more than an A2 level to begin with, then it begs the question: how were they able to graduate high school in the first place? If students were able to somehow slip by language requirements by the time they graduated at 18, one may perceive the notion that these particular students had never had much interest in learning English to begin with. Additionally, the students who attend UNAE, whether they had received a B1 level or not during high school, must prove their B1 level standing by means of a placement test before graduating with their bachelor's (UNAE, n.d.). This being the case, whether students are profoundly interested in their core studies for their education degree or not, one may acknowledge the idea that, for many pupils, striving for a B1 level of a language that they feel they will never need is a waste of time. Therefore, it is not difficult to ponder on the idea that the participants of this research did what they were told simply and only to acquire a passing grade, but while at the same time, they made as little effort as possible to achieve this.

CONCLUSION

Whatever the case, in contrast to a great deal of positive outcomes from research on the topic of learning through teaching, this particular research has proven that there is no significance concerning the amount of time given between evaluating a student teacher's knowledge retention, whether it be immediately after teaching or several weeks after teaching. Additionally, even the participants' test results as a whole were surprisingly okay at best for a few of the grammar points, and rather unsatisfactory for the rest.

Nonetheless, it is quite possible to assume that teaching on the grammar points did not help to reduce the students' grades based on one simple fact: the material had already been professionally taught beforehand. One must consider that the subjects for this research, if one will, received at least two lessons on each grammar point. One lesson was done by means of a more traditional method, in which careful

instruction was carried out by a trained professional. Afterward, another lesson was developed by the student-teachers themselves. However, even with the combination of what essentially was double training on the specified grammar points, the results still seem to contradict the previous hypothesis of this research: student-teachers' knowledge retention will prove more retainable, especially immediately after fulfilling the role of the teacher of a certain topic.

Of course, there are very good arguments as to why and how learning through teaching can be beneficial for students in the long run, and suffice to say that learning through teaching is just one of many several learning strategies that can be employed in the classroom. One can, therefore, conclude that learning through teaching may act as a complement to one's knowledge retention, but certain factors might have been involved that perhaps were not considered at the beginning of this study. Therefore, it is suggested that further research should be conducted with possibly a few variations. First of all, there should be forced involvement of the teaching-learning process on both sides. It would have been interesting to see what critical thinking processes the participants would have developed to reply to possible questions or feedback posed by the students. Secondly, it is recommended that the teacher play more of a role in order to understand how the students are doing during the preparation. It may be wise to ask the students how well they feel about the subject matter; what methods they are using in order to achieve their goal; and/or demand a certain set of requirements, such as a preparation checklist, which would establish a path, not just to better teacher-performance, but maybe better assessment scores as well. Finally, it would be highly suggested that this study be conducted with extremely eager and motivated subjects. No matter the topic, it is easy to infer that a student may not truly take advantage of the practice of learning through teaching, or any kind of strategy utilized in the classroom for that matter unless he or she can reflect on the potential value that the specific learning activity may provide.

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